

Please type a plus sign (+) inside this box

(Modified) PTO/SB/21 (6-98)  
Approved for use through 09/30/2000. OMB 0651-0031  
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Project (PTO/SB/95), no persons are required to respond to a collection of information unless it displays a valid OMB control number.

# TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/954,692
Filing Date	September 12, 2001
First Named Inventor	Phillip A. Paton
Group Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	02-020522

Total Number of Pages in This Submission

## ENCLOSURES (check all that apply)

- ☐ Fee Transmittal Form
- ☐ Fee Attached
- ☐ Amendment / Response
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☒ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53

- ☐ Assignment Papers (for an Application)
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition Routing Slip (PTO/SB/69) and Accompanying Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Writ Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Small Entity Statement
- ☐ Request for Refund

- ☐ After Allowance Communication to Group
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Additional Enclosure(s) (please identify below):  
PTO-1449 form, Cited References and Receipt acknowledgment postcard

### Authorization to Charge Deposit Account

Please charge Deposit Account No. 50-0893 for any additional fees associated with this paper or during the pendency of this application, including any extensions of time for consideration of the documents enclosed.

Remarks

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm  
or  
Individual name

Christopher C. Sappenfield, Reg. No. 45,073, The Law Offices of Jonathan Alan Quine

Signature

*Chris C. Sappenfield*

Date

01-08-02

## CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on this date: 1-8-02

Printed name

Evelyn Gomez

Signature

*Evelyn Gomez*

Date

1-8-02



I hereby certify that the correspondence is  
being deposited with the United States  
Postal Service as first class mail in an envelope addressed to:

Assistant Commissioner for Patents,  
Washington, D.C. 20231.

On 1-8-2002

The Law Offices of Jonathan Alan Quine

By Evelyn Gomez  
Evelyn Gomez

RECEIVED  
FEB 14 2002  
TECH CENTER 1600/2900

Attorney Docket No. 02-020522US  
Client Ref. No. 0103.12BUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Phillip A. Patten, *et al.*

Application No.: 09/954,692

Filed: September 12, 2001

For: METHODS AND COMPOSITIONS  
FOR POLYPEPTIDE ENGINEERING

Examiner: Unassigned

Art Unit: Unassigned

INFORMATION DISCLOSURE  
STATEMENT UNDER 37 CFR § 1.97 and  
§ 1.98

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

The references cited on attached form PTO-1449 are being called to the attention of the Examiner. Copies of the references are enclosed. It is respectfully requested that the cited information be expressly considered during the prosecution of this application, and the references be made of record therein and appear among the "references cited" on any patent to issue therefrom.

As provided for by 37 CFR 1.97(g) and (h), no inference should be made that the information and references cited are prior art merely because they are in this statement and no representation is being made that a search has been conducted or that this statement encompasses all the possible relevant information.

Applicant believes that no fee is required for submission of this statement, since it is being submitted prior to the first Office Action. However, if a fee is required, the Commissioner is authorized to deduct such fee from the undersigned's Deposit Account No. 50-0893. Please deduct any additional fees from, or credit any overpayment to, the above-noted Deposit Account.

Respectfully submitted,



Christopher C. Sappenfield  
Reg. No. 45,073

THE LAW OFFICES OF JONATHAN ALAN QUINE  
P.O. Box 458  
Alameda, CA 94501  
Tel: (510) 337-7871  
Fax: (510) 337-7877

CCS:emg



(Modified) PTO/SB/08A-B (10-96)  
Approved for use through 10/31/99. OMB 0651-0031

Substitute for form 1449A-B/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

Application Number	09/954,692
Filing Date	September 12, 2001
First Named Inventor	Phillip A. Patten
Group Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	02-020522US

## U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code (if known)			
	AA	5,498,531		Jarrell	09-10-1993	
	AB	5,501,962		Bradford-Goldberg et al.	03-26-1996	
	AC	5,538,868		Horn et al.	07-23-1996	
	AD	5,708,153		Dower et al.	01-13-1998	
	AE	5,837,500		Ladner et al.	11-17-1998	
	AF	6,180,406	B1	Stemmer	01-30-2001	
	AG	6,238,884	B1	Short et al.	05-29-2001	
	AH	6,280,926	B1	Short	08-28-2001	
	AI	6,287,861	B1	Stemmer et al.	09-11-2001	
	AJ	6,291,158	B1	Winter et al.	09-18-2001	
	AK	6,291,161	B1	Lerner et al.	09-18-2001	
	AL	6,291,242	B1	Stemmer	09-18-2001	
	AM	6,297,053	B1	Stemmer	10-02-2001	
	AN	6,303,344		Patten et al.	10-16-2001	

## FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	Number	Kind Code (if known)				
	AO	AU	703,264		Stemmer et al.	03-25-1999		
	AP	AU	724,698		Arnold et al.	10-01-1998		
	AQ	AU	732,146		Patten et al.	06-25-1998		
	AR	EP	0 316 018	A2	Cetin Corp	05-17-1989		
	AS	EP	0 316 018	A3	Cetin Corp	05-17-1989		
	AT	EP	0 385 410	B1	Baylor College Medicine	01-25-1990		
	AU	EP	0 439 182	B1	Backman et al.	07-31-1991		
	AV	EP	0 596 918	B1	Birkenmeyer et al.	05-18-1994		
	AW	EP	0 633 944	B1	Bouma et al.	01-18-1995		

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



(Modified) PTO/SB/08A-B (10-96)  
Approved for use through 10/31/99. OMB 0651-0031

Substitute for form 1449A-B/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

Application Number	09/954,692
Filing Date	September 12, 2001
First Named Inventor	Phillip A. Patten
Group Art Unit	Unassigned
Examiner Name	Unassigned
Attorney Docket Number	02-020522US

AX	EP	0 876 509	B1	Maxygen, Inc.	11-11-1998	
AY	EP	0 911 396	A2	Maxygen, Inc.	04-28-1999	
AZ	EP	0 911 396	A3	Maxygen, Inc.	04-28-1999	
BA	EP	1 094 108	A2	Stemmer et al.	04-25-2001	
BB	EP	1 094 108	A3	Stemmer et al.	04-25-2001	
BC	EP	1 103 606	A2	Stemmer	12-02-1996	
BD	EP	1 103 606	A3	Stemmer	12-02-1996	
BE	JP	04 229 200		Backman et al.	08-18-1992	
BF	WO	86/05803		Ballivet et al.	10-09-1986	
BG	WO	90/00626	A1	Baylor College Medicine	01-25-1990	
BH	WO	93/00447	A1	Birkenmeyer et al.	01-07-1993	
BI	WO	93/20227	A1	Bouma et al.	10-14-1993	
BJ	WO	93/24656	A1	Marshall et al.	12-09-1993	
BK	WO	94/08047		Bouma et al.	04-14-1994	
BL	WO	94/12632			06-09-1994	
BM	WO	96/17056		Pasteur Institute	06-06-1996	
BN	WO	97/07206		Okkels	02-27-1997	
BO	WO	97/20918		Short	06-12-1997	
BP	WO	97/35957		Stemmer	10-02-1997	
BQ	WO	98/13485		Stemmer et al.	04-02-1998	
BR	WO	98/13487		Stemmer et al.	04-02-1998	
BS	WO	98/27230		Patten et al.	06-25-1998	

RECEIVED  
FEB 0 2002  
TECH CENTER 1800/2900

## OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T
	BT	Armon et al. (1990) "Assembly of the 26 S complex that degrades proteins ligated to ubiquitin is accompanied by the formation of ATPase activity." <i>J. Biol Chem</i> 265(34):20723-207226	
	BU	Arnold (1998) "When blind is better: protein designed by evolution." <i>Nat Biotechnology</i> 16(7):617-618	

Examiner  
Signature

Date  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Substitute for form 1449A-B/PTO

INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

(use as many sheets as necessary)

Complete if Known

Application Number 09/954,692  
Filing Date September 12, 2001  
First Named Inventor Phillip A. Patten  
Group Art Unit Unassigned  
Examiner Name Unassigned  
Attorney Docket Number 02-020522US

RECEIVED  
FEB 04 2002  
TECH CENTER 1600-9900

BV	Arnold et al. (1997) "Optimizing industrial enzymes by directed evolution." <i>Adv. Biochem. Eng. Biotechnol.</i> 58:1-14	
BW	Bale et al. (1984) "Kinetics of formation of fibrin oligomers III Ligation kinetics concurrent with and subsequent to oligomer assembly." <i>Biopolymers</i> 23(1):127-138	
BX	Barany (1991) "The ligase chain reaction in a PCR world." <i>PCR Methods Appl.</i> 1(1):5-16	
BY	Bolli et al (1997) "Pyranosyl-RNA: chiroselective self-assembly of base sequences by ligative oligomerization of tetranucleotide-2', 3'-cyclophosphates (with a commentary concerning the origin of biomolecular homochirality)." <i>Chem Biol</i> 4(4):309-320	
BZ	Crameri et al. (1993) "Display of biologically active proteins on the surface of filamentous phages: a cDNA cloning system for selection of functional gene products linked to the genetic information responsible for their production." <i>Gene</i> 137(1):69-75	
CA	Daugherty et al. (1994) "Bohr effect of the partially-ligated (CN-met) intermediates of hemoglobin as probed by quaternary assembly." <i>Biochemistry</i> 33(34):10345-10357	
CB	Doyle et al. (1992) "cooperative oxygen binding, subunit assembly, and sulphydryl reaction kinetics of the eight cyanomet intermediate ligation states of human hemoglobin." <i>Biochemistry</i> 31(45):11182-11195	
CC	Gaskin et al. (1997) "Directed evolution of a industrially important enzyme." <i>Biochem Soc Trans</i> 25(1):155	
CD	Gilbert et al. (1997) "Origion of genes." <i>PNAS UDS</i> 94(15):7698-7703	
CE	Giver et al. (1998) "Combinatorial protein design by in vitro recombination." <i>Curr Opin Chem Biol.</i> 2(3):335-338	
CF	Giver et al. (1998) "Directed evolution if a thermostable esterase." <i>PNAS USA</i> 95(22):12809-12813	
CG	Graf et al. (1996) <i>PNAS USA</i> 11591-11596	
CH	Hurst et al. (1996) "A difficult phase for introns-early Molecular evolution." <i>Curr Biol</i> 6(5):533-536	
CI	Kaczorowski et al. (1994) "Asseby of 18-nucleotide primeters by ligation of three hexamers: sequencing of large genomes by primer walking." <i>Analytical Biochemistry</i> 221(1):127-135	
CJ	Kaczorowski et al. (1996) "Automated four-color DNA sequencing using primers assembled by hexameter ligation." <i>Gene</i> 179(1):195-198	
CK	Kalin et al. (1992) "Evaluation of the ligase chain reaction (LCR) for the detection of point mutations." <i>Mutant Res</i> 283(2):119-123	
CL	Kato et al. (1996) "Construction of mini-F plasmid vectors for plasmid shuffling in <i>Escherichia coli</i> ." <i>Gene</i> 170(1):141-142	

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



(Modified) PTO/SB/08A-B (10-96)  
Approved for use through 10/31/99 MB 0651-00

RECEIVED  
FEB 6 2002  
TECH CE 1600/2000

Substitute for form 1449A-B/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Application Number	09/954,692
		Filing Date	September 12, 2001
		First Named Inventor	Phillip A. Patten
		Group Art Unit	Unassigned
		Examiner Name	Unassigned
(use as many sheets as necessary)		Attorney Docket Number	02-020522US

CM	Kikuchi et al. (2000) "An effective family shuffling method using single-stranded DNA." <i>Gene</i> 243:133-137
CN	Kishchenko et al. (1997) "Shuffling of structural elements in filamentous bacteriophages." <i>Proteins</i> 27(3):405-409
CO	Kuchner et al. (1997) "Directed evolution of enzyme catalyst." <i>Trends Biotechnol</i> 15(12):523-530
CP	Laffler et al. (1993) "The ligase chain reaction in DNA-based diagnosis." <i>Ann Biol Clin</i> 51(9):821-826
CQ	Lee (1996) "Ligase 5 chain reaction." <i>Biologicals</i> 24(3):197-199
CR	Long et al. (1995) "Intron phase correlations and the evolution of the intron/exon structure of genes." <i>Proc Natl Acad Sci USA</i> 92(26):12495-12499
CS	Matsumura et al. (1996) "DNA shuffling brightens prospects for GFP." <i>Nat Biotechnol</i> 14(3):366
CT	Meijer et al. (1996) "Directed evolution of a type I antifreeze protein expressed in <i>Escherichia coli</i> with sodium chloride as selective pressure and its effect on antifreeze tolerance." <i>Protein Eng.</i> 9(11):1051-1054
CU	Miller et al. (1997) "Expanding the 43C9 class of catalytic antibodies using a chain-shuffling approach." <i>Bioorg Med Chem.</i> 5(3):581-590
CV	Moore et al. (1997) "Strategies for the in vitro evolution of protein function: enzyme evolution by random recombination of improved sequences." <i>J. Mol Biol.</i> 272(3):336-347
CW	Moore et al. (1996) "Directed evolution of a para-nitrobenzyl esterase for aqueous-organism solvents." <i>Nature Biotechnol</i> 14(4):458-467
CX	Muller-Dieckmann et al. (1995) "Substrate specificity and assembly of the catalytic center derived from two structures of ligated uridylate kinase." <i>J. Mol. Biol.</i> 246(4):522-530
CT	Nakamura et al. (1996) "Two hydrophobic subunits are essential for the heme b ligation and functional assembly of complex II (succinate-ubiquinone oxidoreductase) from <i>Escherichia coli</i> ." <i>J. Biol Chem</i> 271(1):521-527
CZ	Nardi et al. (1997) "Duplication of the prpF gene and shuffling of DNA fragments on the lactose plasmid of <i>Lactococcus lactis</i> ." <i>J. Bacteriol</i> 179(13):4164-4171
DA	Nelson et al. (1996) "Base eversion and shuffling by DNA Methyltransferases." <i>Chem Biol</i> 3(6):419-423
DB	Ohlin et al. (1996) "Light chain shuffling of a high affinity antibody results in a drift in epitope recognition." <i>Mol Immunol</i> 33(1):47-56
DC	Patten et al. (1997) "applications of DNA shuffling to pharmaceuticals and vaccines." <i>Curr Opin Biotechnol</i> 8(6):724-733

Examiner Signature	Date Considered
--------------------	-----------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Substitute for form 1449A-B/PTO

Complete if Known

INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT

(use as many sheets as necessary)

Application Number **09/954,692**  
Filing Date **September 12, 2001**  
First Named Inventor **Phillip A. Patten**  
Group Art Unit **Unassigned**  
Examiner Name **Unassigned**  
Attorney Docket Number **02-020522US**

RECEIVED  
FEB 2002  
TECHNICAL CENTER 1600/2600

DD	Rouwendaal et al. (1996) "Ligase chain reaction for site-directed in vitro mutagenesis." <i>Methods Mol Biol</i> 57:149-156	
DE	Shabarova et al. (1991) "Chemical ligation of DNA: the first non-enzymatic assembly of a biologically active gene." <i>Nucleic Acids Res.</i> 19(15):4247-4251	
DF	Shao et al. (1996) Engineering new functions and altering existing functions." <i>Curr Opin. Struct Biol</i> 6(4):513-518	
DG	Shao et al. (1998) "Random-priming in vitro recombination: an effective tool for directed evolution." <i>Nucleic Acids Res.</i> 26(2):681-683	
DH	Shimmer et al. (1995) "Ligase chain reaction." <i>Methods Mol Biol</i> 46:269-278	
DI	Shuldner et al. (1990) "PCR-induced (ligase-free) subcloning: a rapid reliable method to subclone polymerase chain reaction (PCR) products." <i>Nucleic Acids Res.</i> 18(7):1920	
DJ	Strausberg et al. (1995) "directed evolution of a subtilisin with calcium-independent stability." <i>Biotechnology</i> 13(7):669-673	
DK	Szostak (1997) "In vitro selection and directed evolution." <i>Harvey Lect</i> 93:95-118	
DL	Tortoli et al. (1997) "Evaluation of a commercial ligase chain reaction kit (Abbott LCx) for directed detection of Mycobacterium tuberculosis in pulmonary and extrapulmonary specimens." <i>J. Clin. Microbiol.</i> 35(9):2424-2426	
DM	You et al. (1996) "Directed evolution of subtilisin E in Bacillus subtilis to enhance total activity in aqueous dimethylformamide." <i>Protein Eng.</i> 9(1):77-83	
DN	Youvan et al. <i>Nature</i> 401-410 (1992)	
DO	Zhao et al. (1996) "Strategy for the directed evolution of a peptide ligase." <i>Ann NY Acad Sci</i> 799:1-5	
DP	Zhao et al. (1997) "Functional and nonfunctional mutations distinguished by random recombination of homologous genes." <i>PNAS USA</i> 94(15):7997-8000	
DQ	Zhao et al. (1997) "Optimization of DNA shuffling for high fidelity recombination." <i>Nucleic Acids Res.</i> 25(6):1307-1308	
DR	STATEMENT OF GROUNDS AND PARTICULARS In the Matter of Australian Patent Application No. 732,146. October 12, 2001.	
DS	European Search Report for Application No. 97953571.3	
DT	European Search Report for Application No. 01202349.5	
DU	European Search Report for Application No. 01202350.3	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.